

## Epidemiologic Patterns in Lung Cancer by Histologic Type

ERNST L. WYNDER\* and LIRIO S. COVEY\*

\*American Health Foundation, 320 East 43rd Street, New York, NY 10017, U.S.A.

**Abstract**—Three thousand and ninety-seven lung cancer patients interviewed in different U.S. hospitals in 1977–1984 were classified into Kreyberg I and Kreyberg II categories. In both sexes, Kreyberg II patients were found to be younger and more frequently Jewish; among the male patients only, Kreyberg II cases were higher in educational and occupational level. These differences remained when the effect of cigarette smoking was controlled. Study data showed an increase in the frequency of Kreyberg II cases over time, and significantly, a decrease with younger age of the Kreyberg I : Kreyberg II ratio in both sexes. It is concluded that the observed secular increase in Kreyberg II is real and not merely due to changes in diagnostic methodology. On the basis of demographic differences noted, possible etiologic factors that may have contributed to the recent changes in lung cancer distribution by cell type are suggested.

### INTRODUCTION

ADENOCARCINOMA of the lung is relatively more common in women than in men, in nonsmokers than in cigarette smokers, and compared to tumors of the squamous and epidermoid type, is relatively lower in incidence [1]. The histologic predominance of squamous cell tumors in men may be seen to reflect the influence of cigarette smoking, and to a lesser extent, of selected occupational exposures, both of which are more prevalent in men. The predominance of adenocarcinomas in women, however, holds even in the absence of smoking. This, and the greater frequency of adenocarcinoma among nonsmokers diagnosed with lung cancer, have led to speculation regarding the causal role of a non-cigarette-linked factor that is more common in women.

Since 1977, increases in the rate of adenocarcinoma of the lung, particularly in men, without a similar increase for squamous cell lung cancers have been reported [2–7]. In data obtained in 1962–1975 from 1682 cases at the Roswell Park Memorial Institute, Vincent *et al.* [2] found that, by 1974, adenocarcinoma had overtaken squamous cell lung cancer as the predominant form among their male cases while continuing to be the major histologic type among the women. Similarly,

Valaitis *et al.* [3], studying 219 lung cancer patients admitted to a private hospital in Illinois, found a shift in later years (1963–1967 compared to 1974–1976) to an excess of adenocarcinoma over squamous cell cancer among the men while among the women, the incidence of adenocarcinoma was higher in both periods. In a study of 235 male patients seen in 1974–1978 at the Strang Clinic in New York City, McLamed *et al.* also found a higher frequency of adenocarcinoma over epidermoid cancers (48% vs. 31%) [4]. Studying autopsy specimens from 1017 male patients seen by the Veterans Administration Group in 1958–1977, Cox and Yesner [5] saw the proportion of adenocarcinomas rise from 25.6% in 1958–1967 to 32.2% in the succeeding decade, whereas the proportion of squamous cell cancers dropped from 34.3% to 30.8% in the same periods.

The rising incidence of adenocarcinoma indicated by these hospital-based case studies finds agreement in results of studies which used population-based data. Dodds *et al.* using 1974–1981 SEER data from the Washington State area [6]; Wu *et al.*, using 1972–1981 data from the University of South California, Los Angeles County Cancer Surveillance Program [7], and Percy *et al.* reporting on lung cancer data obtained in 1973–1981 from the seven original SEER areas [8], all found increasing rates of adenocarcinoma in men, while the rates of squamous cell cancers did not change markedly. These studies also found increasing rates of adeno-

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Reprint requests should be addressed to Dr. E.L. Wynder, American Health Foundation, 320 East 43rd Street, New York, NY 10017, U.S.A.